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ERMOU PHASE 1 STUDY

PROJECT ALTERNATIVES SCREENING

July 8, 2015

Prepared for:

Colorado River Water Conservation District

Eagle Park Reservoir Company

Climax Molybdenum Company

Cities of Aurora and Colorado Springs

Prepared by:



HELTON & WILLIAMSEN, P.C.



ERMOU PHASE 1 STUDY SUMMARY

The Eagle River Memorandum of Understanding (ERMOU) contemplates the development of a joint East Slope / West Slope water supply project to be located in the headwaters of the Eagle River watershed in Eagle County, Colorado. Cooperative partners and signatories to the ERMOU are the Cities of Aurora and Colorado Springs; the Eagle Park Reservoir Company (consisting of the Colorado River Water Conservation District, Eagle River Water & Sanitation District, Upper Eagle Regional Water Authority and Vail Associates, Inc.); and the Climax Molybdenum Company (ERMOU Partners). The ERMOU was executed in 1998.

In 2015, the ERMOU Partners directed the ERMOU Technical Advisors, consisting of Wilson Water Group (WWG), RJH Consultants (RJH), Leonard Rice Engineers (LRE), W.W. Wheeler and Associates (WWW), and Helton & Williamsen, PC (H&W), to provide services for an initial screening study of all proposed ERMOU Project Alternatives (Phase 1 Study). The purpose of the Phase 1 Study is to facilitate the development and completion of the alternatives assessment to identify the specific components to evaluate in a more detailed Phase 2 Study.

This Phase 1 Study report discusses the methods of the initial screening study, outlines the rationale to continue or not continue studying specific Project Alternatives, and provides action recommendations based on the results of the Phase 1 Study screening process. The results of the initial screening study identified two levels of recommended activities for Phase 2 of the Study including:

- Tier 1 – Potential ERMOU Project Alternatives Requiring *Feasibility-Level Study*
 - Eagle Park Reservoir Enlargement
 - Whitney Creek Reservoir
 - Bolts Lake
- Tier 2 – Potential ERMOU Project Alternatives Requiring *Preliminary-Level Review*
 - Wolcott Reservoir
 - Piney River Reservoir
 - Eagle-Arkansas Ditch
 - Iron Mountain Reservoir

Accordingly, the approach for a Phase 2 Study is to provide feasibility-level evaluations of the identified Tier 1 ERMOU Project Alternatives, and preliminary-level reviews for the identified Tier 2 ERMOU Project Alternatives. The deliverable of the Phase 2 Study is a technical report that will include a conceptual phased plan for any further required investigations as well as permitting and construction of feasible Project Alternatives to develop the contemplated ERMOU yield.

1.0 BACKGROUND

The ERMOU provides for a water supply project with an annual yield of up to 30,000 acre feet per year. More specifically, the yield consists of a firm dry year yield of 10,000 acre feet for the Eagle Park Reservoir Company, an average annual yield of 20,000 acre feet per year for the Cities of Aurora and Colorado Springs (10,000 acre feet per year each), and up to 3,000 acre feet of reservoir storage space for Climax Molybdenum Company. The project will divert water in priority during the snowmelt runoff period. In order to provide a firm supply of water for West Slope participants, reservoir storage will be required. Water may then be diverted during snowmelt, and subsequently released to the Eagle River during low flow periods.

Numerous development alternatives for the ERMOU have been considered and evaluated by the cooperative partners. These alternatives have considered diversion facilities at a variety of locations upstream of Red Cliff, and the development of water storage in the Camp Hale area or through an expansion of Eagle Park Reservoir. Until recently, these investigations have focused on individual projects, such as an expansion of Eagle Park Reservoir or Camp Hale groundwater, but have not attempted to determine how the entire ERMOU yield could be developed through a combination of projects.

2.0 ERM OU PROJECT ALTERNATIVES SCREENING

The ERM OU Technical Advisors initially identified several potential development elements (or components) that may be used in combination, or alone, to meet the objectives of the ERM OU (Figure 1). Accordingly, the ERM OU Technical Advisors held a one-day workshop on May 27, 2015 and completed a cursory review and screening of the following proposed ERM OU Project Alternatives:

- Expansion of **Eagle Park Reservoir** and a Related Collection System
- Development of a **Whitney Creek Reservoir**, a Related Collection System, and Pump Facilities to Homestake Reservoir
- Enlargement of **Bolts Lake**
- Development of a **Wolcott Reservoir** (Denver Water Site and/or Colorado River District Site) and a Related Collection System
- **Gore Creek Tributary Water Storage** options identified by Tipton & Kalmbach
- Development of a **Mitchell Creek Reservoir**, a Related Collection System, and Pump Facilities
- Development of a **Blodgett Reservoir**, a Related Collection System, and Pump Facilities
- Development of a **Piney River Reservoir**, a Related Collection System, and Pump Facilities
- **Eagle-Arkansas Gravity Alternative**, a Related Collection and Gravity System to the headwaters of the Arkansas River
- Development of a **Iron Mountain Reservoir Joint-Use Facility**, a Related Collection System, and Pump Facilities to Homestake Reservoir
- Development of a **Ruedi Reservoir Pumpback** from Ruedi Reservoir to the Boustead Tunnel

In preparation for the May 27 workshop, the ERM OU Technical Advisors reviewed known, available, and existing evaluations and reports related to ERM OU Project Alternatives for water supply, civil infrastructure/engineering, and environmental/permitting aspects to:

- Obtain information to effectively participate in a workshop;
- Understand work that has been performed for each of the Project elements;
- Identify applicability of previous work to future evaluations; and
- Identify what additional work would likely be needed to evaluate Project alternative feasibility and develop a comparative planning level cost opinion.

ERM OU Library. The existing ERM OU Project Alternatives evaluations and reports were consolidated into the “ERM OU Library” (including a bibliography), which was made available to the ERM OU Technical Advisors and ERM OU Partners prior to the May 27 workshop. The bibliography for the ERM OU Library is found in Attachment 1.

ERMOU Project Alternatives Screening Matrix. The May 27 workshop provided an opportunity to screen out the least viable ERMOU Project Alternatives and to identify the most viable ERMOU Project Alternatives to be considered for a Phase 2 Study. In order to provide for a simple screening process, the ERMOU Technical Advisors cooperatively developed screening criteria, applied the screening criteria in this Phase 1 Study, and documented the ERMOU Project Alternatives that met and did not meet the criteria. Table 1 outlines the key sections of the screening matrix reviewed and applied to each project element:

Table 1. Draft Screening Matrix – Potential ERMOU Project Alternatives

Screening Phase	Screening Category	Screening Criteria
Project Identification	Infrastructure	Storage, Collection, Conveyance
Project Acceptance	Conflict	ERMOU Partnership Acceptance
		Non-ERMOU Partner Issues/Impacts
		Potential for Ancillary/Multi-Purpose Benefits
	Perception	Effectiveness in Meeting ERMOU Goals
		Public/Political Issues and Perceptions
		Potential for Collaborative Strategies
	Environmental	Permitting/Approval Issues
		Permitting/Approval Timeframe
		Potential for Regulatory Streamlining
Project Feasibility	Water Availability	East Slope Yield Contribution
		West Slope Yield Contribution
		Potential to Combine Elements (Portfolios)
	Constructability	Physical Obstacles
		Technical Obstacles
		Implementation Timeframe
	Cost	Capital (\$/AF)
		O&M (\$/AF)
		Potential for Cooperative Funding
Study Decisions	Decision to Continue Studying or Not	
	Rationale for Decision	
	Key Attributes to Study	

The Phase 1 Study screening documentation of the ERMOU Project Alternatives outlined above is provided in the attached matrix (Attachment 2).

3.0 PHASE 1 STUDY CONCLUSIONS

In order to provide the rationale to continue or not continue studying the proposed ERMOU Project Alternatives outlined in Section 2.0 of this report, the Phase 1 Study screening matrix was organized into three (3) distinct tiers:

- Tier 1 – Potential ERMOU Project Alternatives Requiring Feasibility-Level Study
- Tier 2 – Potential ERMOU Project Alternatives Requiring Preliminary-Level Review
- Tier 3 – Potential ERMOU Project Alternatives Screened from Further Study or Review

Accordingly, the ERMOU Technical Advisors applied the screening criteria to each ERMOU Project Alternative to formulate the following rationale for the “tier” selection for each proposed ERMOU Project Alternative outlined below.

3.1 Tier 1 ERMOU Project Alternatives (Feasibility-Level Study)

The following three alternatives are considered key facilities with good potential to contribute to ERMOU water yield objectives and require refined information and decision processes for feasibility-level evaluation.

- Eagle Park Reservoir Enlargement: Key facility; combined storage important (Whitney Creek Reservoir and Eagle Park Reservoir); Require refined information
- Whitney Creek Reservoir: Key facility; combined storage important (Whitney Creek Reservoir and Eagle Park Reservoir); Require refined information
- Bolts Lake: Potential utility for in-basin downstream uses in combination with Eagle Park and/or Whitney Creek.

3.2 Tier 2 ERMOU Project Alternatives (Preliminary-Level Review)

The following four alternatives require compilation of more preliminary information to assess their potential to contribute to ERMOU water yield objectives.

- Wolcott Reservoir (Denver Water and CRWCD Site): Require more information on cost, water quality issues, and potential mutual benefits
- Piney River Reservoir: Require more information on whether there are any opportunities
- Eagle-Arkansas Gravity Alternative: Require more information on value to combined portfolio with other project alternatives
- Iron Mountain Reservoir: Require more information on past studies

3.3 Tier 3 ERMOU Project Alternatives (Screened from Further Study or Review)

The following four alternatives have been reviewed previously and do not meet the screening criteria at this point.

- Mitchell Creek Reservoir: Reviewed previously; limited water availability

- Blodgett Reservoir: Reviewed previously; Whitney Creek Reservoir alternative superior
- Ruedi Reservoir Pumpback: Cost; Conflict; Perception
- Gore Creek Tributary Water Storage Sites: The Gore Creek sites do not meet the screening criteria and are not considered viable at this point (**maintain a placeholder to study if/when other options become less attractive**)
 - Black Gore Creek: Costs exceed benefits
 - Middle Creek: Few identified benefits
 - Indian Creek: Storage economics; Environmental Issues; Technical Obstacles
 - Red Sandstone Creek: Technical Obstacles
 - Buffehr Creek: Low Yield; Environmental Issues

4.0 PHASE 1 STUDY RECOMMENDATIONS

Based on the Phase 1 Study conclusions outlined in Section 3.0, the ERMOU Technical Advisors recommend the following actions of further study (Phase 2 Study) for Tier 1 and Tier 2 ERMOU Project Alternatives including proposed Phase 2 Study work products / deliverables:

4.1 Recommended Actions for Tier 1 ERMOU Project Alternatives (Feasibility-Level Study)

- Eagle Park Reservoir Enlargement:
 - *Concept (All ERMOU Technical Advisors):*
 - 1) Consider as part of a larger portfolio
 - *Environmental (LRE):*
 - 1) Identify/refine environmental issues/approval processes for reservoir enlargement and supporting infrastructure
 - *Water Supply (WWG, H&W, WWW, LRE):*
 - 1) Identify water supply thresholds and East/West Slope benefits
 - 2) Evaluate operational alternatives and combinations of alternatives (e.g., West Slope water supply and environmental demands, East Slope direct supply, Climax storage needs, and multi-purpose utilization of storage)
 - 3) Study supply options further (e.g., East Fork Pump Station enlargement, pump or collection system from Resolution Creek, pump from Eagle River, Climax-Columbine Ditch water, other potential Climax sources)
 - 4) Investigate potential water availability impact on Whitney Creek, Bolts Lake, and downstream water rights
 - 5) Maximize chosen storage; elevation important
 - *Engineering (RJH):*
 - 1) Perform engineering evaluations and develop costs for both Eagle Park Reservoir and Whitney Creek Reservoir, so there is adequate data to compare the costs.
 - 2) Identify the maximum size that is feasible without impacting the existing seepage collection systems and then develop concepts and costs for this maximum size facility.
 - 3) Update/new work on pumping option costs (establish O&M costs)
 - 4) Three collection options:
 - a. Optimize East Fork Pump
 - b. Pump from Cataract Creek and Jones Gulch above Camp Hale
 - c. Pump from Resolution Creek (study East Slope delivery component)
- Whitney Creek Reservoir:
 - *Concept (All ERMOU Technical Advisors):*
 - 1) Consider as part of a larger portfolio
 - 2) Coincide with USFS Camp Hale Restoration Project timing
 - 3) Coincide timing with wetlands mitigation/credit 'changes'

- *Environmental (LRE):*
 - 1) Identify/refine environmental issues/approval processes
 - 2) Develop potential mitigation scenarios w/consideration for Wilderness inundation (IPP/Congress)
 - 3) Identify precedent for Wilderness inundation (Homestake 2 exemption?)
- *Water Supply (WWG):*
 - 1) ID/update benefits for East/West Slope supply alternatives
 - 2) Evaluate operational alternatives and joint use of Eagle Park Reservoir and Whitney Creek Reservoir systems to meet ERMOU objectives
 - 3) Investigate potential water availability impact on Eagle Park Reservoir enlargement, Bolts Lake, and downstream water rights
- *Engineering (RJH):*
 - 1) Identify capacity vs Wilderness capacity curve; get further direction from ERMOU Partners to size out bigger reservoir
 - 2) Propose to evaluate and develop costs for two storage options
 - a. Maximum storage *without* construction in Wilderness
 - b. Maximum storage *with* Wilderness inundation
 - 3) Identify/update costs for pipeline and pump stations to Homestake Creek
- **Bolts Lake:**
 - *Concept (All ERMOU Technical Advisors):*
 - 1) Consider as part of a larger portfolio
 - 2) Attempt to acquire more information
 - *Environmental (LRE):*
 - 1) Identify/refine environmental issues/approval processes
 - *Water Supply (WWG):*
 - 1) Identify when in-priority with and without upstream storage facilities
 - 2) Refine yield estimates
 - 3) Evaluate operation alternatives
 - *Engineering (RJH):*
 - 1) High level review/key issues w/design
 - 2) High level review of diversion/conveyance needs and capacities
 - 3) Identify/update costs

The ERMOU technical advisors intend to generate technical memoranda for each project element summarizing background and key issues, discussion on assessment methodology and other applicable studies, conclusions on feasibility as an ERMOU project element, and recommendations on including project element within a portfolio of combined project elements.

4.2 Recommended Actions for Tier 2 ERMOU Project Alternatives (Preliminary-Level Review)

- Wolcott Reservoir (Denver Water Site and CRWCD Site):
 - *Concept (West Slope Partners):*
 - 1) Flesh out whether viable for West Slope (water quality)
 - 2) Identify potential mutual benefits; Ongoing discussions w/Denver Water
 - 3) Carefully weigh cost/benefits of options
 - 4) Local issues priority (keep regional issues in mind)
 - *Technical (WWG & RJH):*
 - 1) Water Supply (WWG): Identify conditions and options including potential utility and operational benefits for ERMOU parties
 - 2) Engineering (RJH): Identify cursory pipeline options/cost/viability (Avon vs Dowd)
 - *Environmental (LRE):*
 - 1) Identify water quality issues through sensitivity study
- Piney River Reservoir:
 - Establish cursory knowledge of opportunities (i.e. Eisel 2000 Report) (*H&W & LRE*)
- Eagle-Arkansas Gravity Alternative:
 - Establish cursory knowledge of opportunities (*WWG*)
- Iron Mountain Reservoir:
 - Establish cursory knowledge of opportunities (*WWG*)

The ERMOU technical advisors intend to generate technical memoranda for each project element briefly summarizing background and key issues, discussion on assessment methodology (if applicable) and other applicable studies, conclusions on preliminary feasibility as an ERMOU project element, and recommendations on further investigations and on including project element within a portfolio of combined project elements.

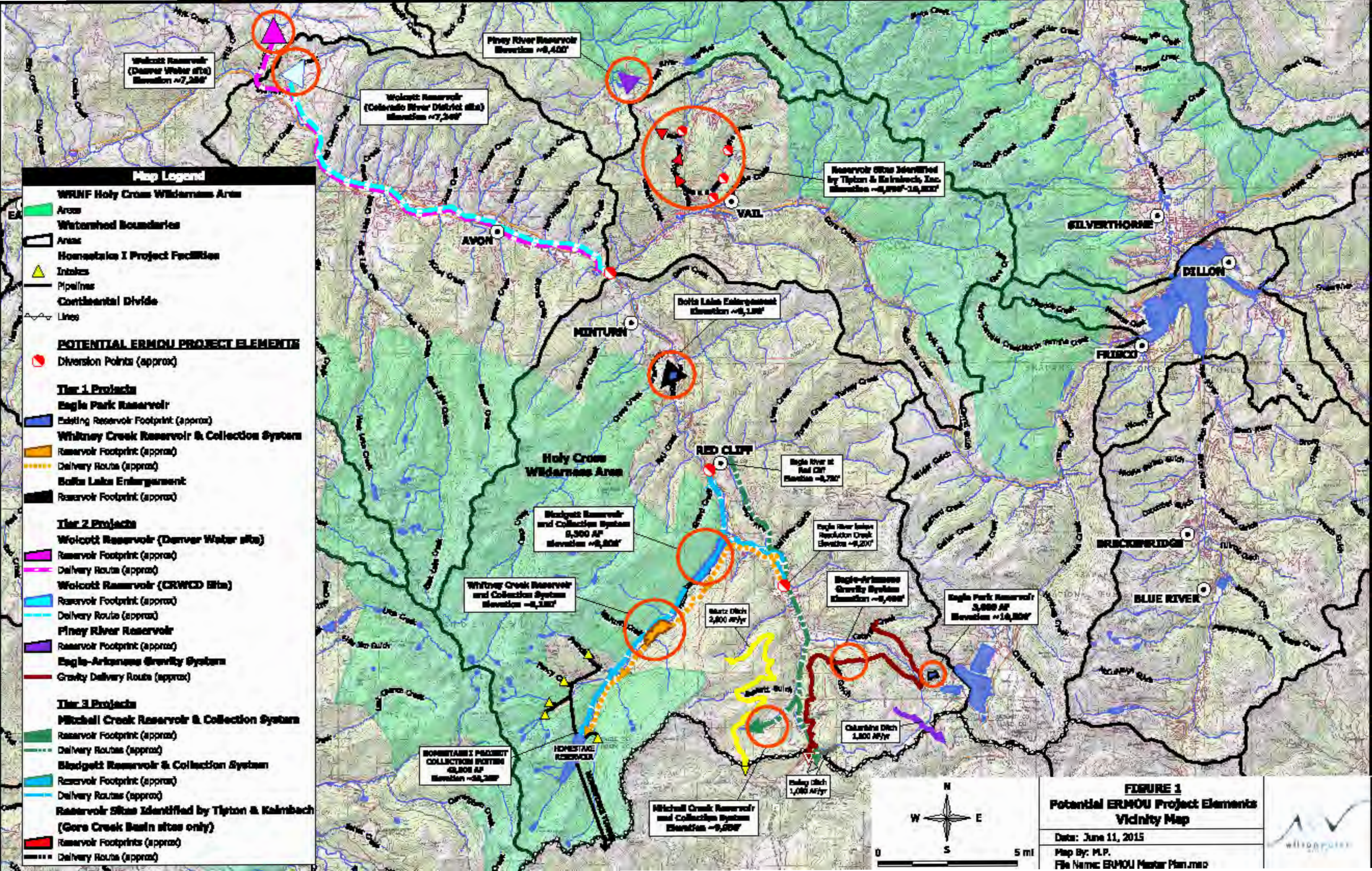
4.3 Phase 2 Study Technical Report

A technical report will be prepared in order to summarize the Tier 1 and Tier 2 work products outlined above. The technical report will include a conceptual phased plan for any further required investigations as well as permitting and construction of feasible project alternatives to develop the contemplated ERMOU yield.

5.0 PROPOSED PHASE 2 STUDY SCHEDULE

Based on the Phase 1 Study results, additional investigations are required to more fully evaluate project feasibility for the recommended Tier 1 and Tier 2 ERMOU Project Alternatives. A proposed project schedule for remaining Phase 1 Study efforts and future Phase 2 Study activities is outlined in Table 2. The Phase 2 Study will include more detailed technical evaluations of the most promising ERMOU Project Alternatives identified in this Phase 1 Study.

Table 2 ERMOU Phase 1 and Phase 2 Study Recommended Project Schedule		
Proposed Work Tasks	2015	2016
PHASE 1		
<ul style="list-style-type: none">ERMOU Technical Advisors Review and Comment on Phase 1 Study ReportERMOU Technical Advisors Prepare Individual Phase 2 Scopes/BudgetsWWG Deliver Combined Phase 2 Scope to ERMOU Partners	June 19 June 26 July 8	
PHASE 2		
<ul style="list-style-type: none">Final Phase 2 Study Deliverables<ul style="list-style-type: none">Task 1. Phase 2 Study WorkshopTask 2. Top Three (3) Feasible Alternatives IdentifiedTask 3. Coordinate Timing with USFS Camp Hale Restoration Project	December 31	March 31



ATTACHMENT 1

Bibliography of Reports Concerning Eagle River Basin 2015

Author	Title	Prepared for	Date	Scanned Image	ERMOU LIBRARY
US Department of Agriculture	Water and Related Land Resources Colorado River Basin in Colorado	Colorado Water Conservation Board	May-65		
Black & Veatch	Environmental Impact Report – Homestake Water Collection System Extension Vol 1 Revised	Aurora and Colorado Springs	May-81		
Tipton and Kalmbach, Inc.	Water Resources Investigation – Reservoir Operation Studies	VVCWD	Mar-83	yes	X
Tipton and Kalmbach, Inc.	Feasibility Study of the Indian Creek Reservoir System	CRWCD & VVCWD	Dec-84	yes	X
Tipton and Kalmbach, Inc.	Vail Valley Middle Creek Diversion System and Vail Valley Reservoir Water Rights - Draft	Vail Valley Consolidated Water District	Apr-89	yes	X
Rocky Mountain Consultants	Report on the Change of Use of the Busk-Ivanhoe System, the Columbine Ditch, the Ewing Ditch, and the Wurtz Ditch – Case No. 90CW52 and Case No. 90CW340 – Draft Report	Board of Water Works of Pueblo	Aug-92	yes	X
W.W. Wheeler and Associates, Inc.	Eagle Park Reservoir Preliminary Engineering Analysis - Revised	Climax Molybdenum Company	Jan-93	yes	X
Helton & Williamsen, P.C.	Estimates of Desirable Storage Volumes in the Eagle River Basin - Draft	VVCWD	Mar-94		
Kumar & Associates, Inc.	Preliminary Geotechnical Engineering Study for Planned-Staged Raises or Replacement of Dam No. 4 Eagle Park Water Storage Reservoir Climax	W.W.Wheeler and Associates, Inc.	7-Mar-94		
Enartech, Inc.	Overview of Eagle River Basin Water Issues	Eagle River Assembly	Apr-94	yes	X
W.W. Wheeler and Associates, Inc.	Change of Water Rights at the Climax Mine and Mill – Case Nos. 92CW233 and 92CW336 Volumes 1 & 2	Cyprus Climax Metals Company	Jul-94		
W.W.Wheeler and Associates, Inc.	Yield Analysis for Eagle Park Reservoir and Robinson Reservoir	Cyprus Climax Metals Company	Dec-94		
Helton & Williamsen, P.C.	Streamflow Investigations – Eagle River Basin	VVCWD	8-Dec-94	yes	X
Helton & Williamsen, P.C.	Eagle Park Reservoir Project – Simulations of Project Yield	VVCWD, UERWA, VAI and Eagle County Board of Commissioners	Jul-95	yes	X
Ueblacker Associates	Upper Eagle River Reservoir Study – Reconnaissance Level Geologic Evaluation of Dam Sites	Enartech, Inc.	11-Jul-95	yes	X
Helton & Williamsen, P.C.	Eagle Park Reservoir Project Water Exchanges – Case No. 95CW348	ERWSD, UERWA and VAI	Aug-96	yes	X
Ueblacker Associates	Reconnaissance Level Geological Investigation - Proposed Dam and Reservoir Sites, East Fork Eagle River	Enartech, Inc.	3-Oct-96	yes	X
Helton & Williamsen, P.C.	Eagle Park Reservoir Project Feasibility Report	ERWSD, UERWA, Vail Associates, Inc.	Jan-97	yes	X
GEI Consultants, Inc.	Cost Estimates for Upper Eagle River Project Colorado - Draft	Vail Consortium, Colorado Springs, Aurora, and CRWCD	24-Jun-97	yes	X
ERO Resource Corporation	Preliminary Environmental Review of the Upper Eagle River Project	Aurora, Colorado Springs, CRWCD, & Vail Consortium	21-Jul-97	yes	X

Bibliography of Reports Concerning Eagle River Basin 2015

Author	Title	Prepared for	Date	Scanned Image	ERMOU LIBRARY
Helton & Williamsen, P.C.	Plan for Augmentation Involving Eagle Park Reservoir – Case No. 98CW203	Vail Associates, Inc.	Apr-99	yes	X
Helton & Williamsen, P.C.	Plan for Augmentation Involving Eagle Park Reservoir – Case No. 98CW204	ERWSD	Apr-99	yes	X
Helton & Williamsen, P.C.	Plan for Augmentation Involving Eagle Park Reservoir – Case No. 98CW205	UERWA	Apr-99	yes	X
Enartech, Inc. and Helton & Williamsen, P.C.	Plan for Augmentation and Exchange – Case No. 98CW270	ERWCD, UERWA, CRWCD, VAI, Eagle Park Reservoir Company, Aurora, and Colorado Springs	Aug-99	yes	X
Unknown	Overview of Eagle River Basin Water Issues -Update	Eagle River Assembly	Jun-00	yes	X
Brown and Caldwell	An Evaluation of Eagle-Piney/Eagle-Colorado Reconfiguration Alternatives	Denver Water	Oct-00		
Golder Associates, Inc.	Documentation of Water Quality at the Eagle Park Reservoir – 2001 Surety Reduction Phase Report	Eagle Park Reservoir Company	23-Sep-03		
Grand River Consulting Corporation and GEI Consultants, Inc.	Wolcott Reservoir Feasibility Assessment - Phase I Investigation	Aurora, CRWCD, Denver Water, ERWSD, Northern Colorado Water Conservancy District, UERWA, and VAI	Jun-04	yes	X
Brown and Caldwell	Feasibility Study – Eagle Park Reservoir Enlargement	Eagle Park Reservoir Company	May-05	yes	X
Brown and Caldwell	Feasibility Evaluation for Lining Chalk Mountain Interceptor and Capturing Additional Flow from the North Ditch For Storage in Eagle Park Reservoir	Eagle Park Reservoir Company	Jul-05	yes	X
Black & Veatch	Camp Hale to Eagle Park Reservoir Water Delivery System – Final Report	Grand River Consulting Corporation	15-Apr-09	yes	X
Grand River Consulting Corporation and Black & Veatch	Eagle River to Climax Water Delivery System – Summary of Project Feasibility	Aurora, Climax Molybdenum, CRWCD, Colorado Springs Utilities, ERWSD and Eagle Park Reservoir Company - Draft	13-Jul-09	yes	X
Helton & Williamsen, P.C.	Letter – Subject: Exchange to Homestake Reservoir -Case No. 09CW28	ERWSD, UERWA, CRWCD, and VAI	11-Aug-09	yes	X
Grand River Consulting Corporation	Columbine Ditch Case No. 09CW188 – Evaluation of Water Supply Available to a Junior Water Right - Draft	Fremont Pass Ditch Company	30-Jun-10	yes	X
Helton & Williamsen, P.C.	Memorandum to K. Kinnear re Pando Feeder Canal conversion to absolute	Eagle Park Reservoir Company	19-May-11	yes	X
Helton & Williamsen, P.C.	Application for Water Rights - Case No. 09CW28	Eagle Park Reservoir Company, ERWSD, UERWA, CRWCD, and VAI	14-Nov-12	yes	X
Grand River Consulting Corporation, RJH Consultants, Inc., and ERO Resources Corporation	Preliminary Evaluation – Lower Homestake Creek Reservoir Sites	Eagle River MOU Participants	24-Jan-14	yes	X

Bibliography of Reports Concerning Eagle River Basin 2015

Author	Title	Prepared for	Date	Scanned Image	ERMOU LIBRARY
Helton & Williamsen, P.C.	Memorandums to D.Gelvin and L.Brooks	Annual operation plans for Eagle Park Reservoir 2004-2014	20-Oct-14	yes	
Helton & Williamsen, P.C.	Memorandum – Subject: Enlargement of Eagle Park Reservoir	Eagle Park Reservoir Company	25-Nov-14	yes	X
Helton & Williamsen, P.C.	Memorandum – Subject: Enlargement of Eagle Park Reservoir	Eagle Park Reservoir Company	2-Dec-14	yes	
Shannon & Wilson, Inc.	Geotechnical Data Report Bolts Lake Reservoir Minturn, Colorado	8140 Partners, LLC	24-Oct-11	yes	X
Applegate Group, Inc.	Bolts Lake Engineering Review - Battle Mountain Project	Battle Mountain Entities	Apr-10	yes	X
Applegate Group, Inc.	Diversion Structure Engineering Review - Town of Minturn & Battle Mountain Project	Town of Minturn and Battle Mountain Entities	Apr-10	yes	X
William S. Otero, PE 8140 Partners, LLC	Feasibility-Level Liner Design Assessment, Proposed Bolts Lake Reservoir	Dave Kleinkopf, Battle North, LLC	15-Dec-11	yes	X
unknown	BMP-Bolts Access-P3-Bolts Lake Access Plan-P3.pdf	unknown	unknown	yes	X
8140 Partners, LLC	BLR Liner Design Pages 07-16-2012.pdf	Battle Mountain Project	16-Jul-12	yes	X
Lawrence E. Violet (Western Engineers, Inc.)	Geologic Reconnaissance of the Wolcott Dam Site	Colorado River Water Conservation District	1983	yes	X
Dave Smith (CRWCD)	Reconnaissance level embankment location, volumes and area capacity curves for 3 alt reservoir sites on Ute Creek	Colorado River Water Conservation District	2010 era	yes	X
Tom Williamsen, Todd Fessenden and John Currier correspondence	Email exchange related to Eagle County's potential future expansion of the landfill	n/a	Dec-14	yes	X
Western Engineers, Inc.	1984 Development Work for the Wolcott Reservoir Project	Colorado River Water Conservation District	Dec-84	yes	X
Western Engineers, Inc.	1986 Development Work for the Wolcott and Red Cliff Projects	Colorado River Water Conservation District	Jan-87	yes	X
Black & Veatch	Eagle River Drainage Basin Diversion Projects	Homestake Partners	Apr-12	yes	X
Enartech Inc. and GEI Consultants, Inc.	Draft - Development of a Water Delivery System from Ruedi Reservoir to the Boustead Tunnel	CRWCD and Homestake Project	Jul-99	yes	X
Enartech Inc.	Iron Mountain Reservoir Joint-Use Project	CRWCD, City of Colorado Springs, and City of Aurora	Feb-90	yes	X

ATTACHMENT 2

Draft Screening Matrix – Potential ERMOU Project Alternatives

Screening Phase	Screening Category	Screening Criteria	Tier 1 - Potential Project Elements Requiring Feasibility-Level Study		
			Eagle Park Reservoir Enlargement 1.1	Whitney Creek Reservoir 1.2	Bolts Lake 1.3
Project Identification	Infrastructure	Storage, Collection, Conveyance	Storage: Existing 3,300 AF (enlarge up to 9,500 AF; 10,785 MSL is toe of Robinson) 6,000 and 8,500 AF alternatives (>8K af start crowding seep water system) 6,000 AF delineates a cost break Collection/Conveyance: Gravity inflow Sheep Mtn, Lake Robinson, Chalk Mtn Intercept 6 cfs (mainly used in dry years), need another source for 9,500 AF	Evaluate 2 size options: One that avoids Wilderness One that maximizes yield	1,200 af (500 af - 1,500 af)
Project Acceptance	Conflict	ERMOU Partnership Acceptance	Yes; Climax doesn't know if they need any of EPR enlargement yet	Yes	Yes
		Non-ERMOU Partner Issues/Impacts	Columbine Ditch off table per Aurora Water Recent 2.5 foot spillway raise = 150 AF enlargement (3,150 to 3,300)	None identified	Key facility for Minturn's supply plan / growth (Ginn development) Altitude issues for development
		Potential for Ancillary/ Multi-Purpose Benefits ¹	None identified	Recreation Pool Late summer/winter releases downstream (West Slope) Forebay to Homestake Reservoir (East Slope) average and wet years	Non-recreational facility
	Perception	Effectiveness in Meeting ERMOU Goals	Yes	Yes	Yes
		Public/Political Issues and Perceptions	None identified	None identified	Superfund site, contamination issues Town of Minturn and Eagle County
		Potential for Collaborative Strategies ²	East Slope (dry year storage?) and West Slope benefits Show East Slope delivery component (meets only part of MOU goal)? Climax benefit? (not sure if Climax wants/needs EPR storage)	Build recreational pool?	Town of Minturn
	Environmental	Permitting/Approval Issues	CWCB ISF Wetlands 9-12 ac impact (some added w/conveyance) 1041 for Lynx winter habitat issues No environmental fatal flaws on storage USFS hurdles (Roadless areas, bypasses)	Wilderness potential fatal flaw Wilderness 5 ac inundation (3-4KAF avoids inundation) All wetlands issues in 'bottom" (wetland mitigation 'changes')	Potential difficulties: Wetlands EPA approval 404/1041 permitting Potential to avoid SUP?
		Permitting/Approval Timeframe	High (>10 years)	High (>10 years)	Medium (5-10 years)
		Potential for Regulatory Streamlining ³	To be identified	Wilderness tradeoff?	EPA may support, less impactful than other sites, Eagle County partner
	Project Feasibility	Water Availability	East Slope Yield Contribution	To be developed/updated	To be developed/updated
West Slope Yield Contribution			3,000-4,000 AFY (to be updated)	To be developed/updated	500-1,000 AFY (to be updated)
Potential to Combine Elements (Portfolios) ⁴			Yes (compare to Whitney Creek costs/benefits) Can EPR option contribute to Whitney option? (Whitney base, EPR dry-year) Can combined EPR/Whitney combination benefit both ES/WS ERMOU goals?	Yes (Eagle Park Reservoir)	Yes (Eagle Park Reservoir)
Constructability		Physical Obstacles	>8,000 AF issues w/Robinson seepage (contamination) High iron content in seepage	No fatal flaws	No fatal flaws, but some effort required
		Technical Obstacles	Lift issues (below Cataract Creek) Significant effort for additional source Perceived issues w/operations at elevation?	No fatal flaws	Lined reservoir, serious technical dam/geology/high GW issues
		Implementation Timeframe	To be identified		
Cost		Capital (\$/AF)	To be developed/updated		
	O&M (\$/AF)				
	Potential for Cooperative Funding ⁵				
Study Decisions	Decision to Continue Studying or Not		Yes (feasibility level)	Yes (feasibility level)	Yes (feasibility level)
	Rationale for Decision		Key facility; combined storage important (Whitney and EPR)	Refined information needs	Be able to have a complete decision process for project proponents
	Key Attributes to Study		Concept (All): Consider as part of larger portfolio Environmental (LRE): Identify/refine environmental issues/approval processes Water Supply (WWG): 1) ID water supply thresholds and East/West Slope benefits 2) Study supply options further (one/multiple pump station?) 3) Maximize chosen storage; elevation important Engineering (RJH): 1) Study East Slope delivery component (w/Tennessee Pass variation) 2) Compare costs/benefits EPR/Whitney Ck 3) Understand better storage thresholds (emphasis on maximum practical) 4) Update/new work on pumping option costs (establish O&M costs) 5) Three collection options: a) Optimize East Fork Pump b) Pump from Resolution Creek c) Pump from Eagle River @ Red Cliff	Concept (All): 1) Consider as part of larger portfolio 2) Coincide with USFS Camp Hale Restoration Project timing 3) Coincide timing with wetlands mitigation/credit 'changes' Environmental (LRE): 1) Identify/refine environmental issues/approval processes 2) Develop cost w/consideration for wilderness inundation (IPP/Congress) 3) Identify precedent for Wilderness inundation (Homestake 2 exemption?) Water Supply (WWG): ID/update benefits for East/West Slope supply alternatives Engineering (RJH): 1) Two storage options (No Wilderness inundation, max yield) 2) Identify capacity vs Wilderness capacity curve 3) ID/update costs for East/West Slope supply alternatives	Concept (All): 1) Consider as part of larger portfolio 2) Attempt to aquire more information Environmental (LRE): Identify/refine environmental issues/approval processes Water Supply (WWG): 1) ID when in priority 2) Refine yield estimates Engineering (RJH): 1) High level review/key issues w/design 2) Explore diversion/conveyance needs and capacities 3) Update costs; package
	Work Products		Technical memoranda for each project element summarizing background and key issues, discussion on assessment methodology and other applicable studies, conclusions on feasibility as an ERMOU project element, and recommendations on including project element within a portfolio of combined project elements		

Screening Phase	Screening Category	Screening Criteria	Tier 2 - Potential Project Elements Requiring Preliminary-Level Review										
			Wolcott Reservoir (DW Site) 2.1	Wolcott Reservoir (CRWCD Site) 2.2	Piney River Reservoir 2.3	Eagle Arkansas Ditch 2.4	Iron Mountain Reservoir 2.5						
Project Identification	Infratructure	Storage, Collection, Conveyance	35,000 af (dry-yr storage)	Storage: 1) Larger 2) Smaller (limited to 3,000 af before inundate existing landfill) Collection/Conveyance: 1) Gravity fill 2) Pump-back to Dowd Junction 3) Simple pump-back w/less storage	Not identified	4,000 - 5,000 af	30,000 af						
Project Acceptance	Conflict	ERMOU Partnership Acceptance	To be identified - define how these elements may provide ERMOU Partner opportunities and may present issues or impacts										
		Non-ERMOU Partner Issues/Impacts											
	Perception	Potential for Ancillary/ Multi-Purpose Benefits ¹	Denver Water discussions Recreation? Fish flows?	To be identified									
		Effectiveness in Meeting ERMOU Goals Public/Political Issues and Perceptions	To be identified - West slope partners to decide if this element is feasible for their needs and whether to keep in list of project elements or not	To be identified									
		Potential for Collaborative Strategies ²											
	Environmental	Permitting/Approval Issues	To be identified per phased approach if preliminary phases warrant further investigation	Wilderness inundation	Roadless Area	Potential Wilderness; crosses Homestake Creek; Wetlands							
		Permitting/Approval Timeframe Potential for Regulatory Streamlining ³		To be identified per phased approach if preliminary phases warrant further investigation									
Project Feasibility	Water Availability	East Slope Yield Contribution West Slope Yield Contribution Potential to Combine Elements (Portfolios) ⁴	To be identified per phased approach if preliminary phases warrant further investigation										
		Constructability						Physical Obstacles Technical Obstacles Implementation Timeframe					
	Cost							Capital (\$/AF) O&M (\$/AF) Potential for Cooperative Funding ⁵					
		Study Decisions						Decision to Continue Studying or Not		Yes (preliminary level)	Yes (preliminary level)	Yes (preliminary level)	Yes (preliminary level)
	Rationale for Decision							Require more information on cost, water quality, and potential mutual benefits		Require more information on whether there are any opportunities	Require more information on value to combined portfolio with other project elements	Require more information on past study	
	Key Attributes to Study							Phase 1 - <u>Concept (West Slope Partners)</u> : 1) Flesh out whether viable for West Slope (water quality) 2) Identify potential mutual benefits; Ongoing DW discussions 3) Carefully weigh cost/benefits of options 4) Local issues priority (keep regional issues in mind) Phase 2 - Technical: 1) <u>Water Supply (WWG)</u> - Identify conditions and options 2) <u>Engineering (RJH)</u> - Identify cursory pipeline options/cost/viability (Avon vs Dowd) Phase 3 - <u>Environmental (LRE)</u> ; Identify water quality issues through sensitivity study		Establish cursory knowledge of opportunities (i.e. Eisel 2000 Report) (<u>Williamsen?</u>)	Establish cursory knowledge of opportunities (<u>WWG?</u>)	Establish cursory knowledge of opportunities (<u>Currier?</u>)	
	Work Products							Technical memoranda for each project element briefly summarizing background and key issues, discussion on assessment methodology (if applicable) and other applicable studies, conclusions on preliminary feasibility as an ERMOU project element, and recommendations on further investigation and including project element within a portfolio of combined project elements					

